After operation on the fetuses, the uterus was sewn closed and gestation continued until day 30, at which time the fetuses were sacrificed.

Individual fetal wet lung weight and total body weight was measured, and the fetal wet lung weight to total body weight ratio (LW/BW) was calculated, as shown in Table 1, below.

TABLE 1

Fetal Wet Lung Weight and Total Body Weight

Animal	Wet Lung Weight (g)	Body Weight (g)	LW/BW
DHTO	0.566	17.246	0.0328
DH	0.238	11.580	0.0206
NO	0.271	11.868	0.0271

DHTO = Diaphragmatic Hernia and Tracheal Occlusion with crosslinked collagen
DH = Diaphragmatic Hernia only
NO = No Operation

The results presented in Table 1 show that the crosslinked collagen was able to occlude the trachea, resulting in normal lung development in the fetal rabbit.

The disclosures in this application of all articles and references, including patent documents, are incorporated herein by reference.

It is to be understood that the above description is intended to be illustrative and not restrictive. Many embodiments will be apparent to those of skill in the art upon reviewing the above description. The scope of the invention should, therefore, be determined not with reference to the above description, but should instead be determined with reference to the appended claims, along with the full scope of equivalents to which such claims are entitled.

The invention has been described above in some detail for the purposes of clarity and understanding. It will be apparent, however, that certain changes and modifications can be practiced within the scope of the appended claims.

What is claimed is:

1. A method for completely or partially blocking, augmenting, sealing, or filling a lumen or void within the body comprising the steps of:

a) providing a polymer and a hydrophilic crosslinking agent in suspension or solution to form an injectable or implantable biomaterial;

b) injecting or implanting the biomaterial into a lumen or void within the body; and

c) allowing the biomaterial to anchor to body tissue surrounding the lumen or void to totally or partially block or fill the lumen or void.

2. The method of claim 1 wherein the polymer is selected from the group consisting of a protein, a synthetic polypeptide, a glycosaminoglycan, a proteoglycan, a polymeric hydrogel, and mixtures thereof.

3. The method of claim 2, wherein the polymer is crosslinked with the crosslinking agent prior to step b), thereby to form a biomaterial which is crosslinked.

4. The method of claim 3, wherein the crosslinked biomaterial is dehydrated prior to step b), and wherein, in step c), the biomaterial rehydrates and swells, thereby allowing the biomaterial to anchor to body tissue surrounding the lumen or void to totally or partially block or fill the lumen or void.

5. The method of claim 4, wherein the dehydrated crosslinked biomaterial is present in particulate form, suspended in a pharmaceutically acceptable nonaqueous carrier, and administered by injection into the lumen or void.

6. The method of claim 4, wherein the dehydrated crosslinked biomaterial is present in rod form and administered into the lumen or void via a catheter or an endoscope.

7. The method of claim 3, wherein the crosslinking agent is selected from the group consisting of aldehydes, carbodiimides, epoxides, and imidazoles.

8. The method of claim 3, wherein the crosslinking agent is a synthetic hydrophilic polymer.

9. The method of claim 8, wherein the synthetic hydrophilic polymer is a functionally activated polyethylene glycol.

10. The method of claim 9, wherein the synthetic hydrophilic polymer is a difunctionally activated polyethylene glycol.

11. The method of claim 2, wherein the polymer is a protein.

12. The method of claim 11, wherein the protein is collagen.

13. The method of claim 12, wherein the collagen is fibrillar collagen.

14. The method of claim 13, wherein the collagen comprises a mixture of particulate crosslinked fibrillar collagen and noncrosslinked fibrillar collagen.

15. The method of claim 14, wherein the particulate crosslinked fibrillar collagen comprises between about 25% to about 95% and the noncrosslinked fibrillar collagen comprises between about 5% to about 75% by weight of the composition.

16. The method of claim 12, wherein the collagen is nonfibrillar collagen.

17. The method of claim 16, wherein the nonfibrillar collagen is methylated collagen.

18. The method of claim 12, wherein the collagen is denatured collagen.

19. The method of claim 2, wherein the polymer is a glycosaminoglycan selected from the group consisting of hyaluronic acid, chondroitin sulfate A, chondroitin sulfate C, dermatan sulfate, keratan sulfate, keratosulfate, chitin, chitosan, heparin, and derivatives thereof.

20. The method of claim 19, wherein the glycosaminoglycan is hyaluronic acid.

21. The method of claim 1, wherein the polymer comprises a crosslinked mixture of collagen and one or more species of glycosaminoglycan.

22. The method of claim 1, wherein the biomaterial further comprises one or more biocompatible fluid lubricant selected from the group consisting of hyaluronic acid, dextran sulfate, dextran, succinylated noncrosslinked collagen, methylated noncrosslinked collagen, glycogen, glycerol, dextrose, maltose, triglycerides of fatty acids, and egg yolk phospholipid.

23. The method of claim 1, wherein the biomaterial further comprises a particulate material selected from the group consisting of ceramic particles, crosslinked or noncrosslinked particulate fibrillar collagen, gelatin beads, polytetrafluoroethylene beads, silicone rubber beads, beads of various hydrogel polymers, silicon carbide beads, glass beads, and mixtures thereof.

24. The method of claim 1, wherein the biomaterial further comprises an effective amount of one or more biologically active agent selected from the group consisting of a wound healing agent, an antibiotic, and an antimicrobial agent.

25. The method of claim 24, wherein the biologically active agent is a wound healing agent selected from the group consisting of: transforming growth factors (TGFs), fibroblast growth factors (FGFs), platelet derived growth factors (PDGFs), epidermal growth factors (EGFs), connec-